~~TOP SECRET~~

[redacted] 25X1

Copy 8

MEMORANDUM FOR: Director, National Photographic Interpretation Center

SUBJECT : Proposed Contract with [redacted] 25X1
25X1 [redacted] for a Simulated Imagery Program at a Cost of

1. This memorandum requests approval for the commitment of funds for a contract. The specific request is stated in Paragraph 7.

2. The Simulated Imagery Program is designed to develop unclassified artificial imagery containing the known distortions and geometric characteristics of the KH-4, [redacted] systems. This imagery will be produced through the development of a computer program for the UNIVAC 494 that will provide the capability for making a graphic plot which will then serve as simulated or artificial imagery. The simulated imagery will be printed on film in the appropriate formats. The specifics of the planned program are contained in both the attached staff study and in the technical proposal.

3. The primary intended use of the simulated imagery is to test and evaluate current and future sophisticated imagery exploitation system developments. The operational imagery that will ultimately be used on the exploitation systems is highly classified due to either its content or due to the nature of the acquisition system and, therefore, cannot be used at the various contractor facilities to check out and accept the systems under development. Furthermore, the simulated imagery could be used to test and evaluate new math model programs for the exploitation of operational acquisition systems, and could serve as a test bed to prepare and debug computer programs for future camera systems.

4. The Contracting Officer will be requested to negotiate this contract in a single phase and on a fixed price basis. The total time anticipated for the completion of this project is four months from the contract date.

5. Three industrial organizations possessing [redacted] clearances were invited to bid on this program. Two did not submit bids. [redacted] 25X1
25X1 [redacted] has submitted an excellent proposal that indicates that they have the understanding and qualifications to accomplish the program.

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[redacted]

6. This study has been coordinated through established internal and external channels, and it has been determined that there is no duplication of effort. TSSG has taken steps to insure that material developed under this proposed program will be compatible with the requirements of the 494 computers in use within NPIC in accordance with concern expressed by Chief, PSG.

7. It is requested that approval be granted to negotiate with the [redacted] for a contract to undertake the Simulated Imagery Program at a cost not to exceed [redacted]

[redacted]
Chief, Technical Services & Support Group
NPIC

Attachments: (3)
1. Catalog Form
2. Staff Study
3. [redacted] Proposal

APPROVAL: _____ _____
ARTHUR C. LUNDAHL Date
Director
National Photographic Interpretation Center

Distribution:
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[redacted]

STAFF STUDY -- SIMULATED IMAGERY PROGRAM

1. PROBLEM

To develop artificial imagery containing known distortions and known geometric characteristics to be used for testing NPIC developed equipment.

2. FACTS BEARING ON THE PROBLEM

a. Sophisticated and complex equipment designed for auto correlation, stereo tracking, anamorphic correction, etc. has been developed or is now under development by NPIC.

25X1

b. These items represent a total projected development cost of approximately [redacted] To insure that these equipments are properly performing their required functions, operational-type imagery is required for test purposes at the various Contractor facilities, and for NPIC Engineering Support Division during final evaluation.

c. Imagery suitable for utilization as realistic test material is normally highly classified, due either to its content or to the acquisition system parameters, which might possibly be reconstructed from the materials. Imagery is seldom available in which the operational and geometric distortion characteristics are completely known. Since ground truth is missing, it often cannot be determined whether the imagery or the equipment being tested is in error.

d. Many Contractors have neither the clearances nor the facilities for storing or handling highly classified material.

e. Computerized techniques may be utilized for simulating complex geometrical situations, where it is not possible or desirable to use the true conditions.

3. DISCUSSION

a. Current Procedures - There presently is no unclassified panoramic strip or strip oblique photography, with all the operational parameters and geometric distortion characteristics known which can be used at Contractor sites to check out instruments or programs under development. Verbal reports

and written data have been used in the past, but this method of solving the problem has never been completely satisfactory and is becoming even more unsuitable as the equipments become more intricate and precise.

b. Origin of Concept - The unsuitability of current procedures has been highlighted during the progress of a number of recent NPIC development programs. As test plans have been developed, there is an increasing awareness that the operational efficiency of instruments designed to reduce the distortions peculiar to certain aerial imagery cannot be thoroughly tested, either at the fabrication sites or at NPIC after installation. Not only does the classification of operational material prevent convenient handling, both in transit and at the Contractor's site, but also our knowledge of the actual acquisition parameters is not sufficiently explicit to permit accuracte testing at NPIC, i.e., ground truth is not available.

c. Proposed Program - It is envisioned that under the proposed project, high precision sample grids will be prepared which have been distorted to appear in the form of operational imagery on pitched pan and strip format. A computer program math model would be constructed which is capable of accepting various changes in such parameters as focal length, altitude, sweep rate, IMC, air speed, film speed, etc. This would produce a graphic printout of a grid pattern which would simulate the appearance of an undistorted grid on the ground, but now distorted as if it had been captured on actual imagery under the specified conditions. This material would then be plotted in actual operational formats and lengths. It would also be possible, once the basic program is written, to produce sets of images with only certain of the variables displayed on each piece of material, in order to avoid any analytical difficulties arising from the simulation of all of the distortion parameters on a single piece of material. Photographic reproductions would then be made of these master printouts for use on an unclassified, or low level classification basis at the Contractors' facilities as well as within NPIC.

d. Selection of Contractor - Because of the sensitive nature of the material being simulated, and in order to expedite the proposed program, only bids from Contractors having the necessary clearances will be solicited. Ideally, the work will be performed by software people already familiar with acquisition systems but not limited to any one company's product. If we were to take one obvious approach and deal with the acquisition system manufacturers themselves, more than one contract might be necessary to obtain full coverage of all of the systems.

e. Coordination - The nature of the proposed task is such that it is highly improbable that duplication would exist within the community. DDS&T will be advised of the proposed activity, however, as well as OCS/CIA and DIA. Internally close liasion with AID will be maintained.

f. Alternatives - The alternative at this point essentially is whether the proposed program should or should not be undertaken. In the first case, a valuable adjunct to the NPIC test capability would be derived which would permit the newer, more complex equipments to be tested and debugged. It would supply a testing means, with changeable inputs, which would permit an assessment to be made of the ability of new and untried systems to cope with varying real-world conditions. If the program is not undertaken, it will be difficult if not impossible to verify the outputs of some of the features which are currently being designed into the newer equipments, and it will be necessary to continue the remaining testing procedures which are becoming more archaic as the equipments to be tested become increasingly more sophisticated.

4. CONCLUSIONS

Present NPIC methods for checking and testing certain film distortion corrections are outmoded. With the arrival at NPIC of equipment now under development, such as the High Precision Stereo Comparator, the NPIC testing capability will be exceeded and will be useless in certain areas. In order to compl-tely test these new equipments, and to permit periodic checks, tests, and verification of these and other systems, imagery of precisely known parameters is required. The proposed project will yield this necessary material through simulation rather than collection. Considering the total development cost of equipment currently nearing the test and evaluation stage, this appears to be a small and rather essential investment to insure that we are, in fact, getting what we paid for.

R & D CATALOG FORM

DATE: 27 February 1969

25X1

1. PROJECT TITLE/CODE NAME: SIMULATED IMAGERY

2. SHORT PROJECT DESCRIPTION: To develop artificial imagery containing known distortions and known geometric characteristics to be used for testing NPIC developed equipment.

5. CLASS OF CONTRACTOR: Manufacturer

6. TYPE OF CONTRACT: Fixed Price

7. FUNDS:
FY 19 $
25X1 FY 1969
FY 19 $

8. REQUISITION NO.:

9. BUDGET PROJECT NO.: NP-0-7

10. EFFECTIVE CONTRACT DATE *(Begin - end)*: 31 March 1969 - 31 July 1969

11. SECURITY CLASS.
A.A. - Confidential
T. - Unclassified
W. - Top Secret

12. RESPONSIBLE DIRECTORATE/OFFICE/PROJECT OFFICER TELEPHONE EXTENSION

25X1 DDI/NPIC/TSSG/DED/

13. REQUIREMENT/AUTHORITY
TSSG/DED requires unclassified imagery, with the same distortion as operational imagery, to use at various contractor facilities to test equipment under development.

14. TYPE OF WORK TO BE DONE
Prepare a computer program for the UNIVAC 494 that will provide the capability for making a graphic plot to serve as simulated imagery of operational material.

15. CATEGORIES OF EFFORT

MAJOR CATEGORY	SUB-CATEGORIES
Other	Precision Measurement Support
	Information Handling Support

16. END ITEM OR SERVICES FROM THIS CONTRACT/IMPROVEMENT OVER CURRENT SYSTEM, EQUIPMENT, ETC.
The end item will be artificial imagery with the known distortions and geometric characteristics of operational imagery. This will be used to insure that exploitation equipment is properly performing its function.

17. SUPPORTING OR RELATED CONTRACTS *(Agency & Other)*/COORDINATION
There are no supporting or related contracts. Coordination has been effected within the Agency and within the intelligence community through COMIREX.

18. DESCRIPTION OF INTELLIGENCE REQUIREMENT AND DETAILED TECHNICAL DESCRIPTION OF PROJECT *(Continue on additional page if required)*
This project is for the development of a computer program suitable for the UNIVAC 494 computer. This computer program will produce a graphic plot of unclassified artificial imagery in the operational film formats. This unclassified imagery can be used at various contractors' facilities to test and accept certain auto-correlation, automatic stereo tracking, etc. features of equipment under development.

19. APPROVED BY AND DATE

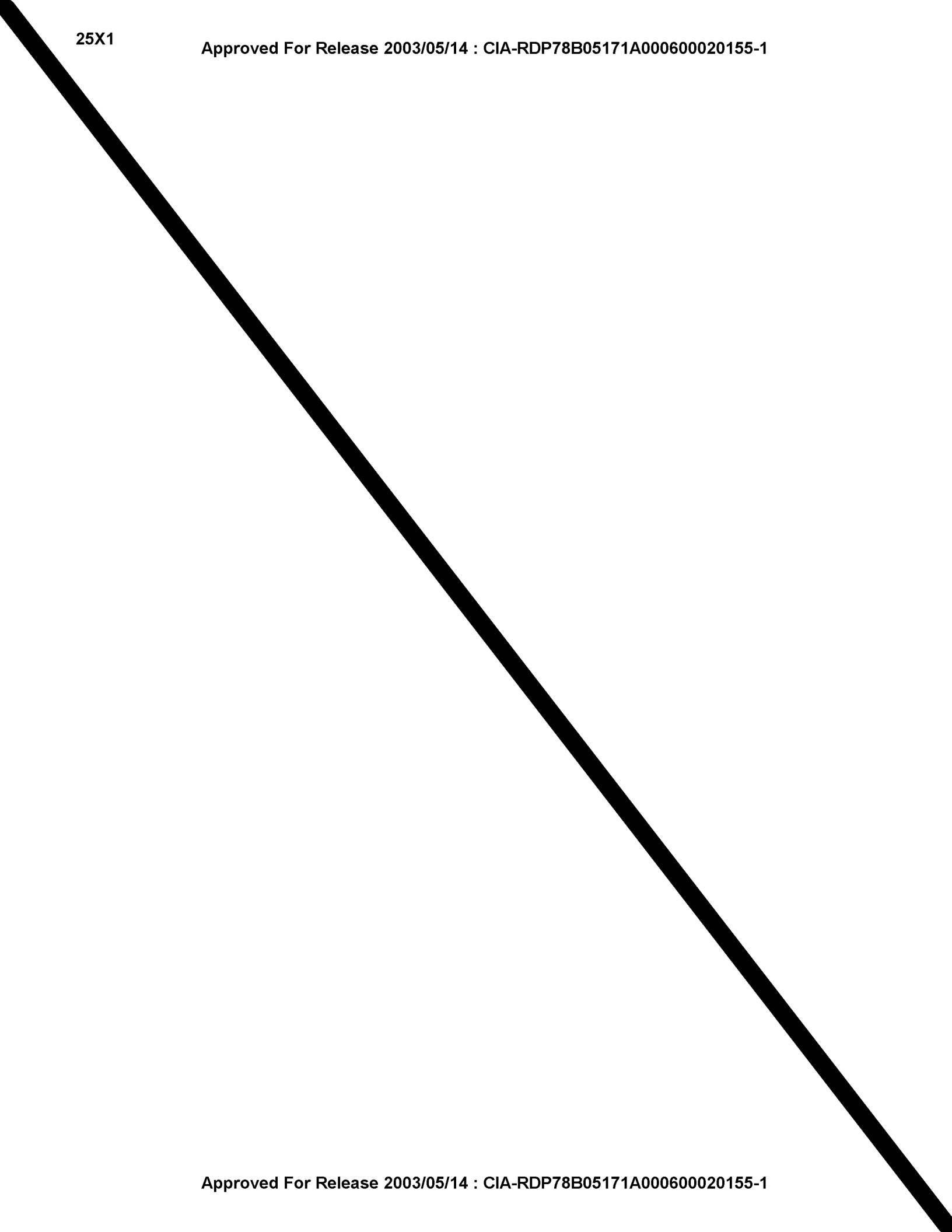
OFFICE	DEPUTY DIRECTOR	DDCI

FORM 11-64 2338

SECRET

GROUP 1 Excluded from automatic downgrading and declassification

(1-13)



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